"James Peale"
<jpeale@mfainc.org>
07/29/2008 12:58 PM

To "BAYUK Dana" <BAYUK.Dana@deq.state.or.us>

cc "McCue, Tom" <Tom.McCue@siltronic.com>, "Gladstone, Alan" <AGLADSTONE@davisrothwell.com>, "Ted Wall" <twall@mfainc.org>, "Erik Bakkom" <ebakkom@mfainc.org>,

bcc

Subject RE: Siltronic, Former UST System Delineation Data and Phased EIB Scale-up

Dana - Thanks for providing this response. We are moving forward with the addendum as directed.

Talk to you soon,

-james

From: BAYUK Dana [mailto:BAYUK.Dana@deq.state.or.us]
Sent: Mon 7/28/2008 5:48 PM
To: James Peale
Cc: McCue, Tom; Gladstone, Alan; Ted Wall; Erik Bakkom; koch.kristine@epa.gov; GAINER Tom; LARSEN Henning; MCCLINCY Matt
Subject: Siltronic, Former UST System Delineation Data and Phased EIB Scale-up

Hello James.

DEQ has reviewed the information provided in the two e-mails you sent on July 17th and 23rd (see below). The e-mails provide updates on the status of supplemental delineation sampling and analytical work being conducted in the vicinity of the former solvent underground storage tank system (former UST system).

Project Status

The e-mail sent on July 17th provides a figure showing the currently available preliminary trichloroethene (TCE) data collected from each push-probe boring. A second attached figure presents the preliminary lay-out for a proposed "first phase" of EHC and KB-1 injections. The July 23rd e-mail supplements the July 17th e-mail by adding preliminary cis-1,2-dichloroethene and vinyl chloride data to the TCE figure.

DEQ understands from the e-mails that based on the data collected to date, Siltronic is proposing to phase EHC/KB-1 injections in the former UST system vicinity. The first phase involves installation of a permeable reactive barrier (PRB) between the former UST system and Fab 1. Siltronic's goal in phasing the project is to expedite implementation of enhanced in-situ bioremediation (EIB), the goal being to initiate EHC injections in late August.

The e-mails acknowledge there are delineation data gaps, including but not necessarily limited to, characterizing the extent of TCE impacts greater than 11,000 ug/L: 1) northwest of push-probe boring GP-122; and 2) at shallower elevations upgradient of the former UST system.

DEQ further understands from the e-mails that Siltronic proposes conducting delineation work in the two areas described above, concurrently with the first phase PRB injections. The e-mail also indicates that additional injection phases are envisioned in the street (an upgradient PRB), and in the vicinity of the former UST system area (source zone treatment). The locations of the additional phases of injection work are to be identified subsequent to completing sampling and analytical work, and evaluating the potential removal of surplus equipment.

Next Steps

The approach to implementing EIB in the former UST system vicinity differs from that presented in the EIB Source Control Work Plan (see footnote). The original approach contemplated a saturation injection strategy, localized within and around the former UST system. DEQ understands data collected during the supplemental delineation work has prompted Siltronic to modify this initial approach, and supports the change conceptually. However, prior to Siltronic moving forward with the modified approach, DEQ will need to review the "addendum" to be prepared consistent with the Pre-Injection Scope of Work (see footnote #2).

The addendum should include the results of all of the work recently completed in the vicinity of the former UST system (e.g., sampling and analytical data, boring logs, vertical permeability tests, supporting figures depicting nature and extent), and descriptions of the phased implementation strategy, including the rational for the geometries of the proposed injection zones. Figures should be provided to show additional drilling and sampling locations, and the sequence and areas for each phase of EIB injections.

Based on the July 17th e-mail, it appears TCE at concentrations greater than 11,000 ug/L will be situated downgradient of the Phase I PRB. As such, consistent with Section 3.3.1 of the work plan, DEQ expects the addendum to further evaluate delivering EHC and KB-1 as far downgradient as practicable using angle drilling and injection methodologies.

The addendum will document Siltronic's modified approach to implementing EIB, and will provide DEQ with information necessary to review the proposed locations for performance monitoring wells.

Please feel free to contact me if you have questions regarding this e-mail, or wish to discuss the content of the addendum further .

Mr. Dana Bayuk, Project Manager
Cleanup & Portland Harbor Section
Oregon Department of Environmental Quality
2020 SW 4th Avenue, Suite 400
Portland, OR 97201

E-mail: bayuk.dana@deq.state.or.us <mailto:bayuk.dana@deq.state.or.us>
Phone: 503-229-5543
FAX: 503-229-6899

Please visit our website at http://www.oregon.gov/DEQ/ <
http://www.oregon.gov/DEQ/>

Footnote. Maul Foster Alongi, Inc., 2008, "Enhanced Bioremediation Source Control Work Plan," May 12, a work plan prepared for Siltronic Corporation.

Footnote #2. Maul Foster Alongi, Inc., 2008, "Pre-injection Scope of Work, Siltronic Corporation, 7200 NW Front Avenue, Portland, OR - ECSI #83," April

17, a scope of work prepared on behalf of Siltronic Corporation.

-----Original Message-----
From: James Peale [mailto:jpeale@mfainc.org <mailto:jpeale@mfainc.org>]
Sent: Wednesday, July 23, 2008 10:04 AM
To: BAYUK Dana; LARSEN Henning
Cc: McCue, Tom; agladstone@davisrothwell.com; Chris Reive; Earle, William G.; Erik Bakkom
Subject: updated delineation data

Dana - as requested, please find the attached figure showing degradation product concentrations. Consistent with the previous email, these data have not been validated by MFA and are subject to qualification and/or revision.

<<Fig_Analytical Data for Completed Boring Locations.pdf>>
The data are consistent with the pre-pilot study data and other data from the source area. In addition, the data at 90 feet from GP-108, GP-109, and GP-110 show patterns consistent with enhanced bioremediation as observed in monitoring wells within and downgradient of the EIB PRB.

Not shown on the figure are analytical results for TCE in MGP DNAPL samples collected from approximately 30 feet bgs in borings GP-123, GP-120, and GP-121. TCE was detected at approximately 500 ug/kg in the samples from GP-120 and GP-121, but was detected at approximately 34,000 mg/kg in the sample from GP-123 (for comparison, naphthalene was detected at approximately 76,000 mg/kg, and benzene was detected at 1,600 mg/kg). These data were only recently received and are being reviewed. These detections warrant further investigation, but do not represent a significant departure from the conceptual site model with respect to the Phased Injection Approach (i.e., starting with the proposed EIB PRB as attached to my previous email) for the purpose of source control. Further investigation of this area can and should occur on a parallel track with the Phase I injections, and will be addressed by subsequent injection Phases.

Also not shown on the figure are soil analytical results from approximately 105-110 feet bgs in GP-112 and GP-113 - TCE and its degradation products were not detected in these samples.

You also requested permeability testing results for deep soil samples (again, approximately 105 to 110 feet bgs) from these borings: the preliminary data indicate hydraulic conductivity ranging from 1e-6 to 2e-7 cm/sec. This is approximately 2-3 orders of magnitude lower than the pneumatic slug testing results in the groundwater sampling intervals. A soil sample for GP-114 was attempted but no silt layer was identified; however, the groundwater analytical data show that TCE and its degradation products are not present at those depths in that portion of the source area.

Boring logs for the soil lithology borings are being reviewed; the soil lithology was generally consistent with previous borings in this area.

We feel that the analytical data we have significantly reduce potential uncertainty related to our proposal for a Phased injection approach. As mentioned previously, we anticipate delivery of EHC in early August, and we are looking forward to reducing concentrations of TCE and its degradation products downgradient of the source area in a timely manner. I look forward to discussing these data with you and Henning at your convenience.

Sincerely,
James

James G.D. Peale, RG
Senior Hydrogeologist
Maul Foster & Alongi, Inc.
3121 SW Moody Ave Ste 200
Portland OR 97239
(o) 971-544-2139 x 2118
(f) 971-544-2140
(c) 503-449-9576
www.mfainc.org <http://www.mfainc.org/>

-----Original Message-----
From: James Peale [mailto:jpeale@mfainc.org <mailto:jpeale@mfainc.org>]
Sent: Thursday, July 17, 2008 4:36 PM
To: BAYUK Dana
Cc: McCue, Tom; Gladstone, Alan; Earle, William G.; Chris Reive; Erik Bakkom
Subject: Updated Delineation Data and Phase I Injection Approach

Good afternoon Dana - attached please find a figure depicting updated delineation data for TCE.
<<Fig_Potential Phase I PRB Alignment.pdf>>
<<Fig_TCE Data for Completed Boring Locations.pdf>>
These data include preliminary and/or unvalidated data and are subject to revision, but are generally representative for the purposes of providing an update. The preliminary cis-1,2-DCE and vinyl chloride will follow in a separate submittal, as will additional samples still being analyzed by the laboratory.

Based on the data, it appears that TCE is present above the injection threshold of 11,000 ug/L at depths ranging from approximately 55 feet bgs to 100 feet bgs in the zone downgradient of the former UST area, with shallower detections in GP-111, and deeper detections toward GP-112 and GP-122.

Attached please also find a proposed Phase I permeable reactive barrier (PRB) layout, which utilizes the PRB design employed for the pilot study. We are proposing an initial injection Phase with installation of this PRB in order to get started as soon as practicable, with a target start date of late August. We note that the western extent of the PRB is projected based upon detections in GP-122, and could be determined by additional exploration/delineation during injections, which would start at the eastern extent and work west.

TCE is also present above the injection threshold at

shallower elevations upgradient of the former UST area. Additional injection Phases could include a secondary barrier located in the street, with supplemental hot spot treatment in other areas to be identified following further evaluation and potential removal of surplus equipment.

We've put a lot of effort into providing an accurate delineation of the source area impacts and I'd like to further discuss the merits of our proposed approach with you at your convenience. I'll call you tomorrow to follow up.

Sincerely
James

James G.D. Peale, RG
Senior Hydrogeologist
Maul Foster & Alongi, Inc.
3121 SW Moody Ave Ste 200
Portland OR 97239
(o) 971-544-2139 x 2118
(f) 971-544-2140
(c) 503-449-9576
www.mfainc.org <http://www.mfainc.org/>